

SOME NOTES ON THE FERNS OF NORTH
QUEENSLAND.

BY THE REV. W. WALTER WATTS.

(Plates lxxxvi.-lxxxix.)

In the winter of 1913 (July-August), I spent a month in the Cairns district in search of Ferns and Mosses. I collected in the rich scrub-lands between Bartle Frere and the Russell River, more especially in the neighbourhood of Josephine Creek; around Babinda also, and up Frenchman's Creek to beyond the Second Falls. Babinda and Frenchman's Creek lie at the base of Bellenden Ker, along the coastal railway. Following, later, the main line, I visited Stoney Creek, Kuranda, Atherton, Malanda, Yungaburra, Lake Barrine, and, last and best of all, Ravenshoe and the Tully Falls. These Notes deal with the Ferns collected during this trip.

It was a great pleasure to make the acquaintance of species after species that belong to the Malayan flora, and are not found even in Southern Queensland. But therein lay the difficulty of determination. Mr. F. M. Bailey, the veteran Government Botanist of Queensland, had kindly supplied me with a number of species, and others were available in the National Herbarium, Sydney, collected mainly by Mr. R. F. Waller, in the Herberton district, in 1908; but the want of access to types has been greatly felt. Valued assistance has been received from Dr. K. Domin's painstaking work on the Ferns of Australia, published in the "Bibliotheca Botanica," under the title "Beiträge zur Flora und Pflanzengeographie Australiens. i.Lieferung," herein referred to as "Prodr." (Prodromus), the secondary title of the first volume of the Beiträge. This work arrived in Australia just about the time that I began my trip, and I had no opportunity of studying it until after my return. This I regretted exceedingly, for Dr. Domin had spent considerable time in North Queensland, and his work raises problems that escaped my notice while in the

field. Students of the fern-life of Australia, especially of the far north, will find Dr. Domin's work, despite its tendency to, in my opinion, undue division of species, quite indispensable. Of the help derived from the various publications of Mr. F. M. Bailey, it is unnecessary to speak. I have only to express my great indebtedness to his published works, and my personal thanks for much kindness received at his hands.

I am greatly indebted also to Captain van A. van Rosenburgh's "Malayan Ferns" (1909).

In recent years, many changes have been made in the nomenclature of the ferns. This is due to historical researches into the earliest specific names, the justice of a return to which must be acknowledged, and also to the inevitable splitting up of such large genera as *Aspidium* and *Polypodium*. Probably the most notable change made has been the discarding of the distinction between *Aspidiæ* and *Polypodiæ*, based upon the artificial character of the presence or absence of an indusium. The genus *Dryopteris* (*Aspidiæ*) contains both indusiate and non-indusiate forms; but a question that will certainly call for attention, sooner or later, is whether the genus *Dryopteris* is not really too comprehensive.

The species herein recorded were all collected by myself, except where otherwise stated.

HYMENOPHYLLACEÆ.

TRICHOMANES L.

Subgen. *Hemiphlebium* Prantl.

T. MOTLEYI V. d. Bosch.

Street's Bush, Kuranda; and Josephine Creek, Bartle Frere; July, 1913.

T. VITIENSE Bak.

Near Tully Falls; August, 1913.

T. BIMARGINATUM V.d.B.; *T. yandinense* Bail.

Street's Bush, Kuranda, and Frenchman's Creek; July, 1913.

Some difficulty has arisen over this plant and its allies. Dr. Christ, in "Die Farnkraüter der Erde" (1897), omits *T. bimar-*

ginatum, but says of *T. muscoides* Sw., "durch die Tropen aller Welttheile." Sadebeck, in *Pflanzenfamilien* (1899), takes the same view, and merges *T. bimarginatum* in *T. muscoides*, according to earlier determinations. Luerssen, in "Fil. Gräf." (1871), held that *T. bimarginatum* was not distinguishable from *T. muscoides* Sw. This opinion he recalled in *Bot. Centralbl.*, ix., 12 (1882). Christensen, in *Index Filicum* (1906), separates these plants and limits *T. muscoides* to tropical America. Domin follows Luerssen and Christensen in this. Bailey's *T. yandinense* appears to be identical with *T. bimarginatum*. F. von Mueller identified *T. yandinense* with *T. cuspidatum* Willd., but this species is apparently limited to Madagascar and E. and W. Africa.

A plant collected by me at Josephine Creek, where it was plentiful on the stems of trees, I at first regarded as *T. bimarginatum*, with which it agrees in its submarginal spurious vein; but the description of *T. bimarginatum* in A. van Rosenburgh's "Malayan Ferns," is "oblong-lanceolate, *not lobed*, sometimes bifid at apex." With this the fig. (Pl. iii.) in Domin agrees, as do also my specimens from Kuranda. The Josephine Creek plant is cuneate-oblong, distinctly and often deeply lobed, with crenulate and undulate margins; the spurious veins also are stronger and fewer. In general outline it resembles the fertile frond of *T. cuspidatum*, according to Christ's figure, and is apparently the plant figured by Bailey in *Q. Bot. Bull.* No.13 (1891), and described as *T. muscoides* Sw. Believing it to differ from all the three plants named, I have ventured to describe it as a new species, and have dedicated it to the veteran pteridologist, Mr. F. M. Bailey.

T. BAILEYANUM, sp.nov. (Plate lxxxvi., fig.1, a-d).

Rhizoma filiforme, longe repens, dense et crasse tomentosum. *Stipites* in seriebus, breves, interdum fere nulli, hirsuti. *Frons* 1-2 cm. longa et ad 0.5 cm. lata, basi anguste et longe cuneata, infra hirsuta, supra nuda, in juventate simplex, vel longa et perangusta vel brevis et basi rotundata, in maturitate latior et in parte superiore profunde lobata, marginibus plus minusve crenulatis et undulatis, nervis validis, plerumque viridibus, pinnatis,

costâ centrali (in frondibus et sterilibus et fertilibus) ad apicem attingenti, segmentis uninervatis, spuriis venulis interpositis et plerumque cum venula submarginali conjunctis; cellulæ elongatæ, muris crassis, levibus. *Indusium* terminale, minutum, immersum, ore late dilatato, cum paucis longitudinalibus spuriis venulis in parte dilatata. *Textura* membranacea. *Color* viridis ad flavo-viridis. *Receptaculum* (in speciminibus) vel non-exserta vel breviter exserta.

On trees, Josephine Creek, Bartle Frere; July, 1913.

This plant differs from *T. bimarginatum* in the deeply lobed, narrowly cuneate frond, the strong pinnate venation both in the sterile and fertile fronds, and in the longitudinal spurious veins, not always easily detected, in the dilated part of the indusium. I have no specimen of *T. cuspidatum*, but, from Dr. Christ's description and figure, in "Farnkr.", our plant is sufficiently distinct. I accept the judgment of Christensen and Domin, that *T. cuspidatum* is not known in Australia. Our plant is not unlike that figured in Beddome's Ferns of British India (Pl.304) as *T. muscoides* Sw.; but see note under *T. bimarginatum*.

Domin's work contains a description of a new species (*T. paradoxum*) from Bellenden Ker. This I did not find, nor the other recorded species, *T. peltatum* Bak., and *T. Sayeri* F.v.M.

Subgen. *Gonocormus* V. d. Bosch.

T. PARVULUM Poir.

Frenchman's Creek, Babinda; Street's Bush, Kuranda; near Josephine Creek; July, 1913.

T. MINUTUM Bl.

Frenchman's Creek, Babinda; July, 1913.

T. PROLIFERUM Bl.

Frenchman's Creek; July, 1913.

T. MAJORÆ, sp.nov. (Plate lxxxvi., figs.2, a-d).

Rhizoma valido-filiforme, repens, obtusis fuscis breviusculis pilis dense vestitum. *Stipes* brevissimus, 1-2 mm. longus, ater, hirsutus. *Frons* olivaceo-viridis, 0.5-1.2 cm. longa, 0.4-0.6 cm. lata, infra cuneata, oblongo-obovata vel rhomboidea, fere ad alatum rhachem pinnatifida, lobis plus minusve elongatis, in 2-3

lobulas breves divisis, apicibus rotundatis; nervus validus, pinnatus; venulæ dichotome ramosæ, infra apicem evanidæ; venulæ spuria numerosæ, breves, flexuosæ, inter nervos irregulariter dispersæ, non marginales; cellulæ irregulariter sexangulares, muris crassis, levibus. *Sori* in lobulis terminalibus immersi. *Indusium* infundibuliforme, vix dilatatum, vix bilabiatum. *Receptaculum* breviter exsertum.

Falls, near Major's Selection, Ravenshoe, Herberton district; leg. Miss Major and Rev. W. W. Watts; August, 1913.

The very distinct spurious venules make it doubtful whether this plant is a true *Gonocormus*, but I place it here tentatively.

The other species of this section recorded for North Queensland are *T. digitatum* Sw., (Bellenden Ker; Domin); *T. nanum* V.d.B., (*T. Kurzii* Bedd.) var. *australiense* Bail.; and *T. Wildii* Bail., (nr. Cairns; C. J. Wild). These I did not find. Christensen, in *Index Fil.*, regards *T. Wildii* as a doubtful species, and Bailey described it with some hesitancy; but it is a good species. It should, perhaps, be described as "pinnatifid," rather than "pinnate," though the lowest segments are sometimes pinnate. The striking characters are the large indusium occupying, upwards, almost the whole segment, with a wide but not two-lipped mouth, and the uninterrupted border of two lines of elongated cells, the inner denser so as to make, apparently, an intramarginal spurious vein, the outer not so long, as a rule, and hyaline. The cell-formation is open, and reminds of that of *T. nanum* var. *australiense*, but the cells are larger. In *T. nanum* also, there is a distinctly thickened submarginal line, and the hyaline cells of the border are short, with thick walls at right angles to the edge, while in *T. Wildii* the hyaline cells are longer and have thinner walls that, for the most part, are slanting (Plate lxxxvi., fig. 4, a-c).

Subgen. *Eutrichomanes*.

T. BARNARDIANUM Bail.

Frenchman's Creek; July, 1913.

This species was also found in the Evelyn Scrub by Mr. R. F. Waller, in 1908 (Hb. Syd.). It would appear to be fairly

frequent. Christensen, in Index Fil., merged the plant in *T. pyxidiferum*, from which, however, it certainly differs. It is more closely allied to *T. bipunctatum*. In the National Herbarium, Sydney, the late Mr. Betche, following Christensen, labelled it as a var. of *T. pyxidiferum*, but, in a note with which I entirely agree, said, "It seems to me so widely different from *T. pyxidiferum* that I would rather keep to Bailey's name." *T. Barnardianum* has the indusium two-lipped, after the manner of *T. bipunctatum*, thus differing entirely from *T. pyxidiferum*.

T. BIPUNCTATUM Poir. (*T. filicula* Bory).

Frenchman's Creek and Babinda Creek; July, 1913.

This species has, according to Luerissen (Bot. Centralbl., ix., No.12), been much confused with *T. pyxidiferum* by Australian botanists, as well as in the Flora Australiensis. He had not seen the true *T. pyxidiferum* among numerous Australian specimens in his possession. I did not find it; but it is recorded by Domin from Bellenden Ker.

T. PYXIDIFERUM L.

A small plant collected by R. F. Waller in the Evelyn Scrub, 1908 (Hb. Syd.), I place here provisionally. See note under *T. bipunctatum*.

T. WALLERI, sp.nov. ("*T. bipunctatum*" Betche, in Hb. Syd.).

(Plate lxxxvi., fig.3, a-d.)

Rhizoma filiforme, repens, breviter ramosum, fuscis pilis dense vestitum. *Stipes* subsessilis ad 1 cm. longus, supra per pinnas decurrentes anguste alatus. *Frons* 1-2cm. longa, 0.5-1.5cm. lata, irregulariter pinnatifida, lobis integris vel in 2-4 angusta integra, irregularia segmenta divisio, rhachi valida, alata, nervis pinnatis, alternantibus, segmentorum apicem versus angustantibus; venulæ spuria numerosæ, prominentes, breves, flexuosæ, plerumque a costâ marginem versus divergentes; cellulæ perminutæ, densæ, irregulares, muris crassiusculis, levibus. *Indusium* pro planta magnum, in brevi segmento laterali, obconicum, supra perlatum, distincte bilabiatum, labiis magnis, obtuse triangularibus, cum apicalibus spuriiis venulis. *Receptaculum* (in specimenibus) non-exsertum.

Herberton district; R. F. Waller, 1908 (Hb. Syd.).

A very distinctive species. The lips of the indusium remind one of *T. bipunctatum*, but the indusium is differently shaped, being perfectly obconical, very like a pegetop or a boy's kite in outline. The absence of the submarginal vein also separates it very definitely from *T. bipunctatum*. In this respect, it is similar to *T. Majoræ*, in which, however, the spurious veins are more or less parallel to the midrib (not "mostly divergent"), and which differs widely in the shape of the indusium, etc.

T. CAUDATUM Brack.

Herberton district; Waller, 1908 (Hb. Syd.). Not previously known in North Queensland, apparently.

T. PARVIFLORUM Poir.

Creek, half-way to Tully Falls (Gordon track); August, 1913.

T. RIGIDUM Sw.

Creek, half-way to Tully Falls; in creeks at several places near Ravenshoe; also Street's Bush, Kuranda. Common; Aug., 1913.

T. pallidum, *T. serratum* (found by Domin on the highest peak of Bellenden Ker), *T. Bauerianum*, *T. rigidum* var. *laxum*, and *T. cupressoides* (found by Domin on Bellenden Ker and recorded as new for Australia) I did not collect.

H Y M E N O P H Y L L U M Sm.

The characters usually relied upon for distinguishing *Hymenophyllum* from *Trichomanes* are more or less unstable. The exerted receptacle is found among the Hymenophylla as well as in *Trichomanes*, a striking instance being Bailey's *H. trichomanoides* (*H. Baileyanum* Dom.); the deeply divided indusium is distinctive of many Hymenophylla; but a more reliable character, probably, is to be found in the cell-formation of the membrane of the spore-cases; those of *Hymenophyllum* being usually regular and numerous, and those of *Trichomanes* irregular and few. In general, however, it may be said, with the late Baron von Mueller, that the distinctions are rather sectional than generic.

The subgeneric distinctions, within *Hymenophyllum*, though convenient, appear to me to be arbitrary. Sadebeck, in Engler's

“Pflanzenfamilien,” divides all the species into *Euhymenophyllum* (leaves entire) and *Leptocionium* (leaves toothed). *Leptocionium* is usually defined as “ultimate segments spinuloso-denticulate.” Dr. Christ gives: “Rand des Laubes buchtig gezähnt, Zähne grannenartig zugespitzt.” Domin has set up an intermediate subgenus (*Hemicyatheon*), containing plants of both kinds: leaves entire and serrate. His distinctions are:

Euhymenophyllum: ultimate segments entire; indusium consisting of two laminae; receptacle as long as the indusium or shorter.

Hemicyatheon: ultimate segments entire or spinuloso-denticulate; indusium funnel-shaped below, connate, profoundly bilabiate above (down to half-way or two-thirds) and campanulato-patent; receptacle long-exserted.

Leptocionium: segments spinuloso-denticulate; indusium divided almost or quite to the base; receptacle enclosed.

The new subgenus seems, to me, to be open to the objections, that it over-rates the value of the length of the receptacle, a feature often difficult to detect in older specimens, owing to the ease with which the exserted receptacle is broken away; and that it brings together species that, in other respects, differ very widely. On the whole, I prefer the old division into *Euhymenophyllum* and *Leptocionium*. But the definition of *Leptocionium* (segments spinuloso-denticulate) suggests the question whether some species may not be “denticulate” without being “spinuloso-denticulate.” A case of this kind has arisen in Domin’s *H. Shirleyanum*. I found specimens of this fern mixed with *H. australe* (leaves entire) in the Sydney Herbarium (leg. R. F. Waller, 1908; Evelyn Scrub). In size, the fronds did not differ seriously from those of *H. australe*, with which they were mixed, but they were more transparent and were somewhat arcuate at the apex. I was inclined at first, before I identified this plant with *H. Shirleyanum*, to regard it as a new variety of *H. australe*, from which it differs, mainly, in having the ultimate segments minutely denticulate. That the presence or absence of minute denticulations should separate two plants into different subgenera, suggests a serious doubt regarding the current subgeneric classi-

fication. I take the broadest view of the two subgenera (seeing it is convenient to follow the accepted classification), as does Sadebeck, and divide the species as follows:

Ultimate segments entire..... *Euhymenophyllum*.

Ultimate segments serrate or denticulate.. *Leptocionium*.

Subgenus i. *Euhymenophyllum*.

Section i. *Receptacle not exerted*.

H. AUSTRALE Willd.; *H. javanicum* Spreng.

Evelyn Scrub, mixed with *H. Shirleyanum* Don.; R. F. Waller, 1908 (Hb. Syd.).

The fronds are considerably larger than any I have seen from New South Wales, though not larger than specimens from the Islands.

H. WALLERI Maiden & Betche, Proc. Linn. Soc. N. S. Wales, 1910, p.802.

On prostrate tree by creek, Major's Homestead, Ravenshoe, Herberton district; August, 1913.

My specimens are smaller and mostly more orbicular than those of the type (Evelyn Scrub; Waller). They were growing in association with *H. Baileyanum*, both species in rather poor condition.

At first, I intended publishing this plant as a new species, but I am convinced that it is only a small form of *H. Walleri*. The description of that species will, however, need some slight modification in the light of the additional specimens. The fronds are described as "1¼" long and 1" broad, sometimes narrower in the sterile fronds." My specimens range from 1-2 cm. long and broad (*i.e.*, not more than 2/3" in greatest length), though they are sometimes, like the type, a little longer than broad. The overlapping pinnæ (in both collections) are very marked; when moist, the pinnules and lobes stand up from the plane of the frond, after the manner of the lobes of a parsley leaf. It should also be noted that scales, similar to those of the rhizome and stipes, are found on the rhachis and costæ, and often fringing the base of the indusium. Perhaps it may be allowable to regard my specimens as var. *orbiculatum*, var.nov.

Section ii. *Receptacle exerted.*

H. BAILEYANUM Dom.; *H. trichomanoides* Bailey, non V. d. Bosch.

On prostrate tree with *H. Walleri*, by creek, Major's Homestead, Ravenshoe; August, 1913. A most distinctive and beautiful species.

Subgenus *Leptocionium*.Section i. *Ultimate segments minutely denticulate.*

H. SHIRLEYANUM Dom., Prodr., p.22, Pls. i., ii.

Evelyn Scrub, mixed with *H. australe*; R. F. Waller, 1908 (Hb. Syd.).

Section ii. *Ultimate segments more or less spinuloso-denticulate.*A. *Receptacle not exerted.*

H. GRACILESCENS Dom., *loc. cit.*, p.23.

Evelyn Scrub; R. F. Waller, 1908 (Hb. Syd., under "*H. tumbri-gense*").

B. *Receptacle exerted.*(a) *Leaves not crisped.*

H. PRÆTERVISUM Christ. (?var.).

Evelyn Scrub; R. F. Waller, 1908 (Hb. Syd.; adjudged by the late Mr. Betche to be "a small form of the common *H. tumbri-gense*").

It is with some hesitancy that I assign this plant to Dr. Christ's species (from Borneo and Samoa) except as a variety. The frond is more compactly ovate, or ovate-lanceolate, and more regularly pinnate than the specimens of *H. prætervisum* (from Samoa) in the Sydney Herbarium; but the two agree in the closely denticulate segments, and the clustering of the sori at the apex of the frond; save that, in Mr. Waller's specimens, the sorus is scarcely stipitate, and the lips of the indusium are crenulato-denticulate, not entire. I attach less importance than I might otherwise have done to this last point, since the lips of the indusium in the Samoan plant are scarcely "entire."

Mr. Waller's plant seems to answer very nearly to the description of the type; but possibly the distinctly crenulato-denticulate

apex of the indusium would warrant making it a variety ("queenslandicum").

Var. AUSTRALIENSE Dom. See *H. pseudo-tunbridgense*.

H. BABINDÆ, sp.nov. (Plate lxxxvii., fig.5,a-c).

Rhizoma filiforme, repens, ramosum, parce hirsutum. *Stipes* 0.5-1.5 cm. altus, in superiori dimidio alatus, alâ supra lata sensim deorsum angustanti denticulatulâ, infra parce hirsutus. *Frons* 1-2 cm. longa et 1-1.5 cm. lata, irregulariter ovato-oblonga vel rhomboidea, pinnatifida, pinnis subflabellatis, in segmenta plus minusve elongata sinuato-denticulata divisa, denticulis sæpe elongatis, angustis, et sursum curvatis, apice rotundato interdum emarginato; rhachis parce hirsuta, late alata, alâ integra vel denticulata; cellulæ elongatæ, muris percrassis, levibus. *Sori* solitarii in segmento angustato prope apicem; indusium basi infundibuliforme, nudum, supra in duas labias profunde divisum, labiis apice subacutis vel anguste rotundatis, integris vel subintegris. *Receptaculum* validum, plus minusve longe exsertum.

On rocks, mixed with *Trichomanes minutum* and Hepatics, Frenchman's Creek, near Babinda; July, 1913.

Very similar to *H. prætervisum*, but the stipes is distinctly winged in the upper half, and the whole of the frond is pinnatifid down to a widely winged rhachis; the segments also, for the most part, are longer, and the denticulations are often strikingly elongated; the sori, too, never seem to be clustered at the apex, as in *H. prætervisum*.

H. PSEUDO-TUNBRIDGENSE, sp.nov.; *H. tunbridgense* var. *exsertum* Bail., 3rd Suppl. Syn. Q. Fl., 1890; *H. prætervisum* var. *australiense* Dom.

Rhizoma valido-filiforme, repens, parce hirsutum, ramosum, ramis atris, hirsutis. *Stipes* 2-3 cm. altus, erectus, angustissime et indistincte alatus, plus minusve hirsutus. *Frons* 4-6 cm. longa et 1.2 cm. lata, ovata vel ovato-lanceolata, erecta vel arcuatula, pinnata, pinnis 6-10-jugis, flabellato-pinnatifidis, segmentis acroscopicis evolutioribus, omnibus modice angustatis (cir. 1-1.25 mm. latis), dense spinuloso-denticulatis, apice rotundato vel interdum emarginato; rhachis angustissime alata, parce hirsuta; cellulæ

elongatæ, angustæ, muris crassis, levibus. *Sori* plerumque solitarii, raro bini, in superiore frondis dimidio, in segmentis brevibus anterioribus. *Indusium* elongatum, angustatum, infra infundibuliforme, connatum, parce hirsutum, supra in duas perlongas labias divisum, apice anguste-rotundato, integro. *Receptaculum* (in speciminibus completis) longe exsertum.

Evelyn Scrub; R. F. Waller, 1908 (Hb. Syd., under "*H. tunbridgense* var. *exsertum* Bail.").

This very distinct species agrees with *H. tunbridgense* in having the sori on short anterior segments next to the rhachis, but differs greatly through the half-cupped indusium with its entire lips, the exserted receptacle, the cell-formation, and the hairy stipes and rhachis. In the cell-formation and in the closely placed, sharp teeth of the segments, it approaches *H. prætervisum*, but differs in size and construction, and especially in the position and structure of the sori. I was, at first, inclined to regard this as a different plant from *H. tunbridgense* var. *exsertum* Bail., but having seen a fruiting frond of var. *exsertum*, I am convinced that the two are identical. Domin made this plant a var. of *H. prætervisum* Christ, but the fructification is not at all clustered at the apex, as it is in Dr. Christ's species.

(b) *Leaves strongly crisped throughout.*

H. KERIANUM, sp.nov. (Plate lxxxvii., fig.6,a-e.)

Rhizoma tenui-filiforme, ramosum, longis flexuosis articulatis paleis parce præditum, præcipue in nodulis frondes gerentibus. *Stipes* 1-2 cm. altus, fere ad basin alatus, alâ sinuoso-denticulata (in speciminibus raro completa), supra latiore. *Frons* 2-3.5 cm. longa et 1-2 cm. lata, ovato-oblonga vel lanceolata, suberecta vel falcata, pinnis alternantibus, modice distantibus, 4-6-jugis, erecto-patentibus, flabellato-pinnatifidis, ultimis segmentis crispatis, sinuato-denticulatis denticulis elongatis pulcherrimis, nervis distinctissimis, rufo-fuscis; rhachis alâ latiuscula, crispata, sinuato-longedenticulata instructa, costis similiter constructis; cellulæ pulcherrimæ, irregulares, plus minusve rubentes, muris crassis lineâ centrali angusta interrupte-hyalina instructis. *Sori* solitarii, 4-6 in segmentis brevibus, anterioribus, in parte frondis

superiore. *Indusium* breviter obconicum, tubo brevi, striis paucis (2 vel 3) prædito, labiis magnis, duas partes tertias ex indusio occupantibus, apice rotundato, sinuato-denticulato ad sinuato-subfimbriato. *Receptaculum* validum, exsertum. Sporæ mediocres, leves, flavæ.

Frenchman's Creek; July, 1913. On rocks.

In the absence of specimens of *H. Neesii* and the allied Boshian species, this new species is set up with some hesitancy. None of these allied plants have, however, so far as I can find, been previously recorded for Australia, and the present plant appears to differ sufficiently, (1) from *H. Neesii* by the sinuato-denticulate wing of the stipes, the absence of the muricate dentations on the indusium, etc.; (2) from *H. aculeatum* by the much narrower wing of the rhachis; and (3) from other species by the striking elongations that often mark the dentations of the wing throughout. The fruiting specimens in my collection are few and old, so that the description of the receptacle and the base of the indusium is liable to correction. The few striæ appear to reach half-way up the indusium, and, in one or two specimens, seem to end in a free seta.

CYATHEACEÆ.

A L S O P H I L A R.Br.

A. REBECCÆ F.v.M., Fragm., v., 53.

Domin (Prodr., pp.28-29) distinguishes vars. *normalis* and *lobulata*, the former, in accordance with the original description, having the pinnules crenato-serrate in the upper half only, and the latter being lobulato-crenate down to the base. The var. *lobulata* is set up for the specimen figured by Bailey in Liths., Pl.32 (collected on Bellenden Ker). I possess a frond of this form, kindly sent to me by Mr. Bailey, under the name *A. Rebeccæ*. Domin does not seem to have collected this variety, nor did I, though but few of my specimens are, strictly speaking, crenato-serrate in the upper half only. On many of the pinnæ, the *lower* pinnules are almost entire below and serrate in the upper half, while the *higher* pinnules are serrate throughout, the terminal pinnule often conspicuously lobed. Very few of my

specimens have the pinnules really entire in the lower half. Bentham, in *Fl Austr.*, vii., 710, says of *A. Rebecca*, "secondary pinnæ undivided, entire or crenate-serrate," and on the same page, "crenate or obtusely serrate." I would suggest that, for the normal form, the description "supra medium crenatis" (F.v.M.), or "supra medium leviter crenato-serratis" (Dom.), should be changed to "supra medium vel ad basin plus minusve crenatis vel crenato-serratis." The var. *lobulata* would still be retained.

Var. LOBULATA Dom.

Herberton district; R. F. Waller, 1908 (Syd. Herb.).

Two pinnæ, in Mr. Waller's collection, correspond, the one exactly, and the other approximately, to this variety. One of these fronds is even more lobed than Mr. Bailey's specimens. In some of the pinnules, the lobe-divisions reach to the rhachis, forming distinct pinnulæ.

A. BAILEYANA Dom.; *A. Rebecca* var. *commutata* Bail., 3rd Suppl. Q. Fl., 1890; Liths., Pl.33.

Mr. Bailey calls this the "Wig Fern," and says, that the long hair-like scales and the metamorphosed lower pinnæ "crown the stem with a wig-like growth." Domin compares these veinless growths with the "Adventivblätter" of *Hemitelia capensis*, figured by Dr. Christ, in *Farnkr.*, p.322, fig.1023. These wig-like pinnæ are so distinctive that, though the ordinary pinnæ resemble those of *A. Rebecca* so closely that Mr. Bailey might well regard this fern as a variety of it, I think Domin is right in making it a new species. The pinnules are wider and longer than those of *A. Rebecca*, and, for the most part, a free vein stands between the branched veins throughout. This fern I did not collect, but there is a specimen in the Syd. Herb., collected by Waller, in the Herberton district—a mere scrap.

A. COOPERI Hook.

Street's Gully, Kuranda; July, 1913.

A. excelsa, *A. Cooperi*, and *A. australis* have given considerable trouble to botanists, largely owing to the inadequacy of the material in Herbaria. The pinnules alone are quite insufficient.

The character of the stem, the roughness or smoothness of the stipes, and the nature of the scales at the base of the stipes, are indispensable factors in the determination of species. The stem of *A. australis* is always densely covered with the distinctly muricate bases of the old fronds; the scales at the base of the stipes are of one kind only, though varying much in size; they are of a rich brown colour, shining, stiffish, more or less appressed, from a broad base gradually narrowed and ending in a very fine prickle-point, entire throughout, or with a margin of hyaline cilia, sometimes slightly serrulate below the prickle-point; moreover, the stipes are comparatively slender. *A. excelsa* and *A. Cooperi* show numerous clean scars on the stem, where the old fronds have fallen completely away; the stipes is much more robust; and the scales are of two kinds, a larger and a smaller, both of them serrate throughout. The differences between *A. excelsa* and *A. Cooperi* are not so sharply defined. The former is much more robust in its growth and attains a much greater height; it is coarser and more coriaceous in the texture of its fronds; the base of the stipes is distinctly muricate, while that of *A. Cooperi* is almost smooth: the scales at the base of the stipes also show distinctive characters; the larger scales of *A. Cooperi* attain a length of 2" and are of a smoky-white colour, while those of *A. excelsa* are much shorter and are light brown in colour; in both species, the smaller scales are reddish-brown and serrated, but, in *A. excelsa*, the serrations appear to be stronger and more closely set than in *A. Cooperi*. The nerves, in *A. excelsa*, are deeply embedded in the more coriaceous substance of the pinnules, while, in *A. Cooperi*, they are generally distinctly visible; the pinnules, too, are wider, with strongly recurved margins. Moreover, the spores of *A. Cooperi* are more papillose than those of *A. excelsa*. Domin follows C. Moore in regarding *A. Cooperi* as a var. of *A. excelsa*; but, after careful examination of specimens of both ferns in the Botanic Gardens, Sydney, I prefer to keep them distinct. Moreover, I incline to the opinion that the typical *A. excelsa* is limited to Norfolk Island, and that the Australian plant, throughout, is *A. Cooperi*. More extended observations are, however, necessary, especially on Norfolk Island

and in tropical Queensland. Unfortunately, my Kuranda specimens lack the base of the stipes, but the spores are those of *D. Cooperi*. The stem was scarred.

POLYPODIACEÆ.

i. ASPIDIÆÆ.

DRYOPTERIS Adans.

Subgen. *Eudryopteris*.

D.(?) DECOMPOSITA (R.Br.) O. Ktze.

Stoney Creek, and Railway Cutting, near Cairns; July, 1913.

This is recorded with doubt. Domin did not find the true *D. decomposita* in North Queensland. See *D. rufescens*.

D. ALBO-VILLOSA, sp.nov. (Plate lxxxviii., fig.8,*a-d*).

Rhizoma et stipitis basis desunt. *Stipes* elongatus, stramineus, tener, subflexuosus, plus minusve villosus. *Frons* ovato lanceolata vel subtriangularis; longe acuminata, circa 45 cm. longa et 30 cm. lata, utrinque villosa, rhachi et costis dense villosis, villis longis, albis, mollibus, articulatis; pinnis numerosis, lanceolatis, ad 25 cm. longis et 7 cm. latis, longe acuminatis, subfalcatis, pinnulis lanceolatis, obtusis, pinnatifidis, lobis brevibus, subovatis, acute serratis, pinnatinervatis. *Sori* magni, mediales in lobis, præcipue in nervis superioribus. *Indusium* rotundum, reniforme, glandulari-pubescent, glandibus flavis.

Stoney Creek, near Cairns; July, 1913.

In outline and general structure, very similar to *D. decomposita*, but much more pubescent, and the pinnæ are more regularly shaped. I regret that my specimens were defective. The complete plant, with rhizome and attached stipes, is to be desired.

Subgen. *Phegopteris*.

D. TROPICA (Bail.) Dom.; *Polypodium aspidioides* var. *tropica* Bail.
Cairns district; July to August, 1913.

D. (?) RUFESCENS (Bl.) C. Chr.

Specimens collected in the Railway Cutting between Redlynch and Stoney Creek appear to belong here, but may possibly represent a new species. In the Sydney Herbarium, there is a note

by the late Mr. Betche, in which he says, "*Polypodium rufescens* Bl., is given as a Queensland fern in Synops. Filic., and in Christensen's Index Fil., but Bentham writes (Fl. Austr., vii., p.759), 'Some specimens of *A. decompositum* with small fronds and broader, more membranous and less acute segments appear almost identical with specimens of *P. rufescens* from Ceylon. The supposed Australian specimens of that species are undoubtedly referable to *A. decompositum*.'" "

The specimens collected by me, I should certainly hesitate to refer to *D. decomposita*, for there is no sign whatever of an indusium, and the differences in other respects are noticeable.

DRYOPTERIS (?) sp.nov.

Specimens collected, I believe, in the Railway Cutting (Redlynch to Stoney Creek) have the base of the stipes castaneous and clothed with very fine hairs. They belong probably to a new species, but the material is not sufficiently complete for definite decision.

D. SETIGERA (Bl.) O. Ktze.; *Polypodium pallidum* Brack.

Stoney Creek, etc.; July, 1913; also a small form in the bed of the Barron River, above Kuranda.

Subgen. *Cyclosorus*.

D. GONGYLODES (Schkhr.) O. Ktze; *Nephrodium unitum* R.Br.

Var. *PROPINQUA* (R.Br.) Van A. van Rosenb.; *Nephrodium propinquum* R.Br.

Among reeds on margin of Lake Barrine; August, 1913.

Some confusion exists regarding this species and its variety *propinqua*. Bailey, in his "Fern-World of Australia," makes *Aspidium unitum* "pubescent or glabrous." Beddome, in "Ferns of Southern India," p.31, says, of *N. unitum*, "glabrous above, cano-tomentose beneath, especially on the costa and veins;" also, "involucres small, reniform, at length glabrous." His Pl.88 shows these characters. Of *N. propinquum*, Beddome says (p.32 idem), "glabrous or often more or less pubescent, resino-glandulose, especially beneath;" also, "involucres reniform, setose." His Pl.89 shows the setose involucre, but the figure is quite different from the *Aspidium unitum* var. *propinquum* of Bailey's

"Lithograms." Van A. van R. ("Malayan Ferns") says, of *D. gongylodes* (*Nephrodium unitum*), "rachis and surfaces naked;" and, of var. *propinqua*, "rachis and under-surface hairy." Domin apparently follows A. van R., in his var. "*glabra*" (the typical form), and "var. *propinqua*," which latter, he says, has, in Australia, the wider distribution.

This agrees with Robert Brown's original descriptions in the "Prodromus," p. 148, where *Nephrodium unitum* is characterised as, "frondibus pinnatis, pinnis ensiformibus serrato-incisis, glabris; incisuris semiovatis, acutis, venis indivisis, soris submarginalibus, costa rhachibusque glabris." *N. propinquum* is described as "frondibus pinnatis, pinnis ensiformibus, apice attenuatis subtus pubescentibus inciso-pinnatifidis, lobis semi-oblongis acutis venis indivisis, soris submarginalibus confertis, involucri barbatis, rhachi pubescentulâ."

My specimens from Lake Barrine show the pubescent rhachis and under-surface distinctly; and, therefore, I record them as var. *propinqua*.

D. PARASITICA (L.) O. Ktze.; *Polypodium molle* (Jacq.); *Aspidium molle* (Jacq.) Lueres.

Banks of Barron River, Kuranda, and many other places; July-Aug., 1913.

Var. *DIDYMOSORA* (Benth.) Dom.

Banks of Barron River, Kuranda; July-Aug., 1913.

DRYOPTERIS sp.

Kuranda, on northern side of Barron River; and in Frenchman's Creek, Babinda; July, 1913.

I hesitate to separate this plant from *D. parasitica*; the fronds show very similar characters, save that the stipes possesses several pairs of auricles reaching almost to the base, and giving it a very distinctive appearance. The whole plant looks like a diminutive tree-fern, the rhizome being upright (some 6-9 inches in height). The nervation and fructification are those of *D. parasitica*. Unfortunately, some good specimens of the whole plant I left behind me in a part of Frenchman's Creek, to which I was unable to return.

D. TRUNCATA (Poir.) O. Ktze.

Creeklet at base of Bartle Frere; July, 1913. This is the only spot at which I saw this fine fern during the whole of my trip.

Subgen. *Goniopteris*.

D. UROPHYLLA (Wall.) C. Chr.

By creek, Yungaburra; August, 1913.

Domin records two forms of this magnificent fern, viz., f. *sub-integra* and f. *crenata* (both from Harvey's Creek). The description of *Polypodium urophyllum* in H.B., Synops., p. 314, is, "the edge entire or very slightly lobed." My specimens (all taken from one spot, though probably not all from one plant) show considerable variation in the nature of the leaf-margin; in some pinnæ, the lower half is subentire and the upper crenate.

D. PÆCILOPHLEBIA (Hook.) C. Chr.

Rocky Hill, Kuranda; also near Yungaburra, and on the banks of Lake Barrine; July-August, 1913.

(?)Var. Densa, var. nov.

Textura densior; sori majores; inferior pinnarum margo sæpe profunde incisa.

This variety is set up with some doubt. The deeply incised lower margins are very noticeable where they occur, and the much denser consistency of the leaves is very marked. I place here my own specimens, collected, I believe, at Lake Barrine, and also a specimen of *D. pæcilophlebia* sent to me by Mr. F. M. Bailey; collected on the Endeavour River by Miss Lovall.

(?)D. HILLII (Bak.) C. Chr.

A single frond, among my specimens of *D. pæcilophlebia*, shows distinctly villose costæ, and may possibly belong to *D. Hillii*, a species which I have never seen. The figure in Bailey's "Liths." (149) is, as pointed out by Domin, that of a different species. *D. Hillii*, according to H.B., Synops., p. 505, is "simply pinnate."

D. TRIPHYLLA (Sw.) C. Chr.; *Meniscium triphyllum* Sw.

By creeklet, at base of Bartle Frere, and also in Palm scrub at eastern end of the mountain, near railway line; July, 1913. Mr.

Bailey told me he had not seen specimens of this fern from North Queensland. Domin found it at Harvey's Creek and Lake Eacham. It has a wide Indo-Malayan range.

ASPIDIUM Sw.

A. MUELLERI C. Chr.; *A. confluens* Mett., non Fée.

Very plentiful by creeks throughout the Cairns Hinterland. Some of my best specimens were obtained near the "Crossing" at Malanda. Domin sets up two forms (f. *simplicius* and f. *decompositum*), and figures an intermediate form on p. 55. The species shows so many variations in the leaf-form, that it hardly seems worth while to attempt to distinguish them by exact definition. *A. Muelleri* is one of the most beautiful and striking of the ferns of North Queensland, and a handsome addition to the bushhouse.

In Domin's opinion, there is no need to change Mettenius' name, seeing that Fée's *A. confluens* is a doubtful species; but this is surely an insufficient reason for ignoring Fée's nomenclature, and I have, therefore, followed Christensen (Index).

POLYSTICHUM Roth.

P. CONIIFOLIUM Presl.

In scrub, Ravenshoe, Herberton district; Dr. Joynt, Aug., 1913. (Herb. Watts): Herberton district; Waller, 1908 (Hb., Syd.).

Dr. Joynt brought in but a single frond of this fern, which I at first regarded as *P. aristatum* (Forst.). According to Domin, the main difference between *P. aristatum* and *P. conifolium* is, that the former has a creeping, and the latter a tufted, rhizome; he believes that the Australian specimens belong mostly to *P. conifolium*. According to Van A. van Rosenb., the scales of *P. aristatum* are hair-like, or more or less setiform, while those of *P. conifolium* are long-linear-lanceolate. In that case, Dr. Joynt's specimen is *P. conifolium*.

P. FRAGILE, sp. nov. (Plate lxxxviii., fig. 9, a-g).

Epiphyticum, spectabile. *Rhizoma* crassum, repens, paleis brunneis ad 1.5 cm. longis anguste et flexuose acuminatis dense

vestitum, paleis apicalibus pallido-brunneis vel pallescentibus. Stipes ad 4-6 dm. longus, flexuosus, basi paleis pallido-brunneis vestitus, supra nudus, parce muricatus, canaliculatus. Frons late lanceolata, basi 6-8 dm. lata, laxe pinnata, pinnis inferioribus oppositis, superioribus alternantibus, subsquarrosis, anguste lanceolatis, 1-4 dm. longis et 1 dm. latis; pinnulis lanceolatis, utrinque æqualibus, inferioribus basi 2-3 cm. latis, ad alatum rhachem pinatifidis, superioribus subintegris, pinnatinervatis, siccis facile frangentibus, nervis indistinctis; rhachi et costis nudis, glabris, supra canaliculatis, pinnularum costis subtus distincte elevatis supra depressis. Sori mediales ad 8 per pinnulam, solitarii in lobis, indusio rotundo, profunde inciso, cito contrahenti, fugaci, paraphysibus albis articulatis cum sporangiis intermixtis. *Textura* subcoriacea. *Color* pallido-viridis, haud nitens.

This handsome fern was collected in a "Falling" on Major's homestead, near Ravenshoe (Watts, Aug., 1913). It was epiphytic on, I believe, the Bird's-Nest Fern. I mistook it for *P. adiantiforme* (*capense*), from which, however, it differs through the much thicker rhizome, the split indusium, which shrivels even on the young sorus, the more distant and almost squarrose pinnæ, the laxer build, and the less coriaceous texture; also, by the fact that the midrib of the pinnules is prominently raised on the *lower* side and depressed (canaliculate) on the upper side, whereas, in *P. adiantiforme*, the midrib is distinctly raised on the upper side. The ease with which the pinnæ are broken up in drying is very characteristic; it is really difficult to preserve perfect specimens.

POLYSTICHUM sp.

Some imperfect specimens of a beautiful species, probably new, are in the Sydney Herbarium (collected by Mr. R. F. Waller in the Herberton district). The late Mr. Betche regarded them as belonging to *P. adiantiforme*, and made the following notes:—

1. "Less coriaceous than any other specimens we have, and with hardly any scales on the stem. It may be undescribed, but the rhizome is needed as well as the base of the leaf-stalk. Not recorded from Queensland. 28.4.09."

2. "This seems to be the tropical form of *P. adiantiforme*, distinguished by the soft texture from the typical form, but by no other essential characters, so far as I can see. 11.09."

The specimens, however, have an indusium with a sinus, which differentiates the plant at once from *P. adiantiforme*; and the secondary rachis and the costæ are flattened or depressed on the upper side and raised beneath. (See note under *P. fragile*).

Mr. Waller's plant differs greatly from *P. fragile*, and I have no doubt that, given the rhizome and the base of the stipes, it could be described as a new species.

LEPTOCHILUS Kaulf.

L. CUSPIDATUS (Presl.) C. Chr.; *Acrostichum repandum* Bl.

Near Josephine Creek, Bartle Frere; Kuranda; and Ravenshoe; July-Aug., 1913.

L. NEGLECTUS (Bail.) C. Chr.; *Acrostichum neglectum* Bailey;
Gymnopteris Diels, Nat. Pflanzenfam.

Kuranda, in creek, on northern side of the river; also at Ravenshoe; July-Aug., 1913.

OLEANDREÆ.

OLEANDRA Cav.

O. NERIIFORMIS (Sw.) Cav.

I did not find this rare fern, but there is a good specimen in the Sydney Herbarium, collected by Mr. Waller, in the Herberton district, in 1908.

DAVALLIÆÆ.

ARTHROPTERIS J. Sm.

A. OBLITERATA (R.Br.) J. Sm.; *Aspidium ramosum* P. Beauv.

Near the Russell River, at base of Bartle Frere; July, 1913.

This is Domin's var. *normalis*. It is well figured in Bailey's "Lithograms," t. 125. The pinnæ are of unequal length.

Var. LINEARIS (Bail.) Dom.; *Aspidium ramosum* var. *lineare* Bail.

Throughout the Cairns district, especially at the base of Bartle Frere, near the Russell River; July-Aug., 1913.

A. BECKLERI (Hook.) Mett.; *Polypodium Beckleri* Hook., Spec. Fil., iv., 224; *Aspidium ramosum* var. *Eumundi* Bail.

Ravenshoe (by Falls), etc., Cairns district; July-Aug., 1913.

Domin states (p. 62) that Bailey's plant is perfectly identical with *A. Beckleri*.

A. SUBMARGINALIS Dom., Prodr., p.62.

On south side of Bartle Frere, near Russell River; July, 1913. Specimens also in Hb. Syd., from Herberton district; leg. Waller, 1908.

Mr. Bailey questions the validity of this species, but my specimens entirely agree with Domin's description, and are differentiated from *A. obliterated* by the submarginal sori and the characteristic leaf-formation.

A. tenella J.Sm., (common in South Queensland and New South Wales, and better known as *Polypodium tenellum*), I did not find in the Cairns district, nor Domin's new species, *A. prorepens*.

NEPHROLEPIS Schott.

N. BISERRATA (L.) Schott; *N. exaltata* var. *biserrata* Bak.; *Aspidium exaltatum* var. *longipinnum* Bentham, Bailey et al.; *Aspidium acutum* Schkr.

Stoney Creek; and near Bartle Frere; July-Aug., 1913.

N. HIRSUTULA (Forst.) Presl.; *N. exaltata* var. *hirsutula* Bak. Stoney Creek, etc.; July, 1913.

Some confusion has crept into the series of ferns, of which *N. exaltata* is the basal form, owing partly to the fact that in leading descriptions of *N. exaltata*, the varieties "biserrata" and "hirsutula" are included. It is preferable, with Van A. van Rosenb. and Domin, to regard these so-called varieties as distinct species. The typical *N. exaltata* is figured by Bailey, in his "Lithograms," t. 123. *N. biserrata* has a much longer and more acute pinna, and the sori are more distant from the margin; while *N. hirsutula* is distinguished by the woolly scales on the rhachis and surfaces, and the erect, narrow acroscopic auricles at the base of the pinnae. Domin rightly says, of *N. hirsutula*, "Ab affine *N. exaltata* var.

biserrata facile distinguitur pinnis utrinque sed præcipue supra paleis albis dispersis latioribus fimbriatis et piliformibus intermixtis instructis, rachis paleis piliformibus appressis densis sublanuginosa, soris submarginalibus, pinnis basi superne auriculatis, auriculis angustis erectis."

N. exaltata (L.) and *N. acutifolia* (Desv.) I did not find, though I understand that the latter is plentiful near Cairns.

HUMATA Cav.

H. REPENS (L. fil.) Diels; *Davallia pedata* Sm
Frenchman's Creek (Second Falls); July, 1913.

DAVALLIA Sm.

D. DENTICULATA (Burm.) Mett.; *D. elegans* Sw.
Rocky Hill, Kuranda; July-Aug., 1913.

D. PYXIDATA Cav.

Rocky Hill, Kuranda; July, 1913.

MICROLEPIA Presl.

M. SPELUNCÆ (L.) Moore.

Stoney Creek, near Cairns; July, 1913.

SCHIZOLOMA Gaud.

S. ENSIFOLIUM (Sw.) J. Sm.; *Lindsaya* Sw. et al.

Hillside, track to Coffee Plantation, Kuranda; July-Aug., 1913.
Very plentiful, and in the most varied forms.

This species is so extremely variable, that the attempt to minutely subdivide it into a number of varieties and forms would appear to be of doubtful value. Domin has subjected the material (Asiatic and Australian) in the Kew Herbarium, as well as that collected by himself in North Queensland, to the most careful and painstaking scrutiny, and has set up the varieties (for Australia) *normale*, *heterophyllum* (*Lindsaya heterophylla* Dryand.) (with forms *rhomboideum* and *angustipinnum*), *medium* (*Lindsæa media* R Br.), *intercedens* var. nov., and *Fraseri* (*Lindsæa Fraseri* Hook). While appreciating Dr. Domin's painstaking investigations, and attaching great weight to his opinion, my own experi-

ence in North Queensland inclines me to think that a careful study of growing plants of *S. ensifolium* would reveal the existence of different forms and even supposed varieties on the same plant. Among my material, I have forms corresponding to Domin's f. *rhomboideum* and f. *angustipinnum* of var. *heterophyllum*, but I am doubtful whether they were not growing on the same plant. Should I have another opportunity of visiting the Cairns district, I would spend some hours on that hillside at Kuranda, carefully examining and comparing the plants *in situ*. Meanwhile, I venture to express the opinion that the variations of form in this species are so bewildering, that it is of little avail trying to tie them all down to distinctive names.

The practice, followed by Domin, in the case of species with variations, of making the type of the species "var. normale," does not commend itself to me; for, of necessity, it means that the description of the species must be made to cover all its varieties, and this, in turn, would mean that, whenever a new variety was discovered, the species would have to be redescribed. Would it not be better to let the specific description stand for the type, and then to let the varieties, as they arose, be described in relation to the type?

LINDSAYA Dryand.

L. CULTRATA Sw., var. CONCINNA (J. Sm., as species) Dom.

Kuranda; July-Aug., 1913.

According to Domin, var. *concinna* differs from the type (*L. cultrata*) mainly in size. All the examples collected by him in North Queensland belonged to var. *concinna*, as well as all the Queensland specimens he had examined. Mine also belong to the variety.

L. DECOMPOSITA Willd.; *L. lobata* Poir.

Kuranda; July-Aug., 1913.

Domin distinguishes vars. *contigua* and *davallioides* (*L. davallioides* Bl.) from the specific type (his var. *normalis*). Among my specimens are the typical form and the var. *contigua*; and in the Sydney Herbarium are specimens of var. *davallioides*, collected by R. F. Waller, in the Herberton district, in 1908.

ASPLENIEÆ.

ATHYRIUM Roth.

A. UMBROSUM (Ait.) Presl., var. AUSTRALE (R.Br.) Dom.

Near Josephine Creek, Bartle Frere; July, 1913.

The typical *A. umbrosum* comes from the Atlantic Islands. Robert Brown (1810) described the corresponding Australian plants as *Allantodia australis* and *A. tenera*. Domin notes the commoner Australian form as *Athyrium umbrosum* var. *australe*, but says that its difference from the typical Atlantic fern is "not large." My specimens (from Josephine Creek) agree with specimens in the Sydney Herbarium, collected at Herberton, by Mr. Waller, and at Atherton by Miss Mackenzie. They, however, differ from the common New South Wales form in having much more attenuated pinnæ, in showing a more narrowly-winged secondary rachis, narrower and more closely-set pinnules, and a more delicate texture. A specimen in the Sydney Herbarium, collected on the Dorrigo, comes very near to the North Queensland fern. Is this Robert Brown's *A. tenera*?

Var. TENERUM Bail., Fern World of Australia, p.52: Lith. t. 115.

One or two plants that I collected in a creek, near Tully Falls, (mostly in a young state) appear to me to belong here.

Bailey, *loc. cit.*, says of var. *tenera*, that "it is a more membranous form, having darker and more slender stipites. Sori more distant, and the indusium not so much broken at maturity." Domin (p. 57) says that this is an exceptionally delicate fern of very thin texture, with slender dark brown (often blue-brown) stipes, and more deeply coloured rachis, with distant, shortly but distinctly stipitate pinnules, more distant ultimate segments, and with fewer, narrower, and rather longer indusia. He adds, that the identity of Bailey's var. *tenera* with Brown's *Allantodia tenera* is not fully established.

DIPLAZIUM Sw.

D. LATIFOLIUM (Don.) Moore; *Asplenium maximum* Don.

Close to creek, Yungaburra; Aug., 1913.

The growth of the Yungaburra fern was so much stronger than the form occurring on the Richmond River, that I hesitated in its

determination, but its identity is undoubted. There are specimens in the Sydney Herbarium, collected at Atherton by Miss Mackenzie, and at Herberton by Mr. Waller.

D. POLYPODIOIDES Bl.

Stoney Creek, near Cairns; July, 1913.

D. PROLIFERUM (Lam.) Thouars; *Asplenium decussatum* Sw.

By Josephine Creek, Bartle Frere; July, 1913.

This striking fern I found only at one spot. The name, *decussatum*, by which it has been commonly known, must give place to the older *proliferum*. Van A. van Rosenburgh (Malayan Ferns, p. 424) gives var. *accedens* ("stipes muricate or spinulose throughout"), and my specimens must, possibly, be placed under this variety. Domin remarks similarly regarding his Bellenden Ker specimens.

A S P L E N I U M L.

A. NIDUS L.

Common in the Cairns district.

A. SIMPLICIFRONS F.V.M.

Throughout the Cairns district especially at Kuranda, in the scrubs on the northern side of the river. Occasionally, the frond is forked at the tip. Bailey, in Bot. Bull. xiii., (1896) describes a var. *laciniatum*.

A. UNILATERALE Lam.; *A. resectum* J. Sm.

Var. AUSTRALIENSE Bail.

Base of Bartle Frere; July, 1913.

A very rare fern. Previously recorded from Johnstone River (leg. Kefford), and hills of Mulgrave River (leg. Bailey, 1889); also found in the Evelyn Scrub by Mr. Waller, in 1908. I know of no other records. The variety is apparently well-based; the rhizome being shorter and the stipites closer together than in the typical form, while the pinnæ are less cut away on the lower side. The figure of *A. resectum* in Beddome's "Ferns of Southern India" (t. 132) may be compared with Bailey's figure of var. *australiense* in his Third Supplement to "Syn.Qld.Fl.," and in "Liths."

A. ADIANTOIDES (L. as *Trichomanes*) C. Chr.; *A. falcatum* Lam.

Common in the scrubs of North Queensland.

Domin describes the varieties *fibrillosum* and *macrurum*, and refers to the vars. *caudatum* (*A. caudatum* Forst.), and *Whittlei* (Bail.). Var. *macrurum* is the very large form occasionally met with; I found it near Malanda and at Ravenshoe. The species is so variable, that it hardly seems advisable to define varieties. Compare Luerssen, "Fil. Graeff.," p. 155-6, 1871.

A. BAILEYANUM (Dom.) Watts; *A. Hookerianum* Col., var. *Bailey-anum* Dom.; *A. Hookerianum* var., Bailey, 3rd Suppl. Qld. Fl., p. 93.

In scrub at base of Bartle Frere; July, 1913.

This fern is quite comparable with *A. Hookerianum* Col., in some of its forms, but as that species belongs to the far South (New Zealand, Tasmania and Victoria), and as the North Queensland fern has a distinctive outline and other distinguishing features, it seems to me best to regard it as a separate species. Bailey's description of the Queensland variety is as follows (*loc. cit.*): "Rhizome short or shortly repent, the crown and base of stipes densely clothed with dark brown scales; stipes tufted, slender, 4 or 5 inches long, dark brown and slightly scaly. Fronds bipinnate, narrow-lanceolate, in outline attaining 8 inches in length, and not over 3 inches wide in the broadest part; pinnules cuneate, the lower ones often divided to the base, the end incised-dentate. Sori usually long and narrow."

It may be added that the scales, while similar to those of *A. Hookerianum*, are more shortly-celled at the base, and are entire or denticulate, while in *A. Hookerianum* they are subfimbriate; also that the first acroscopic pinnule on each pinna is more or less prominent, and grows parallel to the rhachis, that the petioles of the pinnæ are much shorter than in *A. Hookerianum* (sometimes almost none), and that the texture of the leaves is firmer and closer than in that species.

A. AFFINE Sw.

Gullies on northern side of Barron River, Kuranda, and at other places in the Cairns district; July-Aug., 1913.

My specimens fully agree with Bailey's figure in Liths., t. 110, though not with that in Hook., Sp. Fil., ii., t. 202, which shows the pinna with longish acumen. The pinna in Beddome's fig. (under *A. spathulinum* J.Sm.), in "Ferns of Southern India," t. 226, is still more long-acuminate, and the whole frond has a different appearance from that of my specimens and of Bailey's figure. Van A. van Rosenburgh (Malayan Ferns, p.472) says, of *A. affine*, "Pinnulæ distinct, rhomboidal-triangular, blunt or acute, incisoserrate or deeply pinnatifid to pinnate again, the base obliquely cuneate; lowest pinnulæ acute . . . the higher ones and those of the higher pinnæ with the outer edge more or less bluntish or more or less rounded to truncate, crenate." This allows, partly, for the blunt pinnules of my specimens, but none of my fronds have the lowest pinnules "acute"; they are all blunt. I record the species, however, on the authority of Mr. Bailey's figure, which Domin cites without criticism.

A. LASERPITHIFOLIUM Lam.; *A. cuneatum* Lam., var. *laserpitiifolium* F.v.M.(1866). Domin follows F.v.M.

In scrub at base of Bartle Frere; July, 1913.

My specimens are smaller than those described by Van A. van R. (Malayan Ferns, p. 472), but appear to correspond in every other respect with the descriptions and figures available. They are larger and more robust than Domin's var. *orarium*, from Cape Grafton.

A. præmorsum Sw. (*A. furcatum* Thunb.), *A. cuneatum* Lam., *A. affine* Sw., and *A. laserpitiifolium* Lam., form a group of nearly related plants that have given considerable difficulty to students.

A. PARVUM, sp.nov.

Rhizoma fasciculatum minutum radiculosum, radiculis sublongis, cum pilis tenuibus flexuosis brunneis dense vestitis. *Stipes* 2-3 cm. longus, infra fuseus supra (in juventate) subviridis, basi paleis brunneis minutis lanceolatis longe et flexuose acuminatis instructus, nudus vel subglandulosus. *Frons* ad 8 cm. longa et 2.5 cm. lata, ovato-lanceolata, infra pinnata supra pinnatifida; pinnis

breviter petiolatis, anguste decurrentibus, cuneato-obovatis vel cuneato-lanceolatis, flabellato-nervatis, margine infra integro supra crenato-serrato; facie antica per nervos elatos flabellato-striata, rhachi viridi flexuosa subglandulosa. *Sori* elongati, duas tertias partes ex inferiori nervi parte occupantes, maturitate totam pinnæ mediam tegentes, sed finem margine distantem habentes. Indusium introrsum aperiens. Capsulæ annulo perangusto. *Textura* herbacea. Color juventute læte-viridis, maturitate fuscus.

Growing, in very small quantity, in bushhouse, Gladesville, N.S.W., on a tuft of *Polypodium subauriculatum* brought from the Cairns district (probably from Ravenshoe); Aug., 1913.

In consequence of the smallness of the material, this species is set up with some hesitancy. It is comparable with *A. Wildii* Bail., which, however, is a larger fern, with a more pronounced acroscopic development at the base of the pinnæ, and with sori that reach nearer the upper margin.

BLECHNEÆ.

BLECHNUM L.

Subgenus *Eublechnum*.

B. CARTILAGINEUM Sw., (?) var. TROPICA Bail.

Base of Bartle Frere; July, 1913.

B. SERRULATUM Rich.

In swamp by railway line, Cairns; August, 1913.

B. ORIENTALE L.

Banks of Railway Cutting, just above Kuranda; Aug., 1913.

My specimens are much smaller than the typical form, but appear to agree with it in every other respect.

B. WHELANI Bail., Rept. Gov. Sci. Exped. Bellenden Ker, 1899, p.77.

Near top of Bellenden Ker; Miss J. S. Gibbs, 1914.

Judging from Mr. Bailey's figure (Liths. 91), Miss Gibbs' specimens are in better condition than were his, and the sori reach nearer to the base of the pinnæ.

Subgenus *Lomaria*.B. PATERSONI (R.Br.) Mett.; *Stegania Patersoni* R.Br.

(!) Var. ELONGATUM (Bl.) H.B., Syn.

Ravenshoe; Aug., 1913.

Robert Brown's original description of *S. Patersoni* was, "frondibus indivisis; sterili ensiformi-lanceolata crenulata; fertili linearis." Domin, therefore, makes the form with the undivided fronds var. *normale*, and separates the plants with divided fronds under the name var. *elongatum*, following Hooker and others. This hard-and-fast distinction, I am unable to uphold. On the Richmond River, I frequently saw *B. Patersoni*, and, almost invariably, divided and undivided fronds, grew from the same rhizome, which bears out Bentham's remark (F. Austr., vii., 735), "from almost all the Australian localities there are specimens with undivided and with pinnatifid fronds, and sometimes the two from the same rhizome." In the Sydney Herbarium, there are several specimens with undivided fronds, but in one case, attached to a common rhizome, there are both divided and undivided fronds, though the divisions in the pinnatifid fronds are limited in number, not more than two or three. In this specimen, both kinds of fronds are quite typical in their form, and in the possession of crenulate margins. The plants came from the Tweed River, in the far north of New South Wales. Another specimen, collected in the Port Jackson district, possesses small undivided fronds, but also one large frond with two subopposite divisions a little less than halfway up, and a very long (40 cm.) apical continuation, which is 3.5 cm. wide in the broadest part; along with it, is a fertile frond much and linearly divided. Another specimen (from the Richmond River) has both undivided and much-divided fronds with the typical crenulate margins. In the light of these specimens, the var. *elongatum* is scarcely tenable. But, on the other hand, my own specimens (from Ravenshoe) and specimens collected at Herberton by Mr. Waller, both having undivided as well as pinnatifid fronds, show a somewhat different facies, are of a thinner texture (so that the venation is perfectly clear), have entire or almost entire margins, except at the apex of the lobes,

and have usually a nervature that is more perpendicular to the rhachis. On these grounds, it may be allowable to separate the var. *elongatum*, but, in my judgment, certainly not on the mere ground of the form of the fronds.

B. DISCOLOR (Forst.) Keys.

Near Ravenshoe; Aug., 1913.

STENOCHLÆNA J. Sm.

S. SORBIFOLIA (L.) J. Sm., var. LEPTOCARPA (Fée) Benth.,
(*Acrostichum*).

Common in the scrubs of the Cairns district, climbing the trees to a great height. The delicate fruiting fronds I did not see growing, save at the top of the plant, generally high up. Mr. Bailey rightly says that this is "one of the most beautiful of climbing ferns."

S. PALUSTRIS (Burm.) Bedd.; *Acrostichum scandens* Hook.

Climbing up bushes and trees on the margin of Lake Barrine; also in swamp close to Cairns; Aug., 1913.

The pinnae of this strong climber are very sharply serrate throughout. Mr. Bailey seems to have had before him specimens that were "entire or slightly dentate," but mine are all sharply serrate, in this agreeing with Beddome's figure in "Ferns of Southern India" (t. 201).

D O O D I A R.Br.

D. CAUDATA (Cav.) R.Br.

Shaded bank of creek, Tea Gardens, Kuranda; Aug., 1913.

Domin (Prodr., p. 120 ff.) has some very valuable notes upon the species of this genus, *Doodia*, and especially upon *D. caudata*, which always has, at least, its lower pinnae free and separate ("frei und getrennt"). My specimens appear to be quite typical of the normal form (var. *normalis* Dom.).

P T E R I D E Æ.

S Y N G R A M M A J. Sm.

S. PINNATA J. Sm.

In bush at edge of track to Coffee Plantation, on northern side of the Barron River, Kuranda; Phillip Mackenzie, July, 1913.

This is a striking species, with a large Indo-Malayan range.

P E L L Æ A Link.

P. FALCATA (R.Br.) Fée.

Ravenshoe; Aug., 1913.

My specimens appear to belong to the normal type (Domin's var. *normalis*; "robusta, pinnis circa 3 cm. longis"). Domin states that he did not collect this form in Queensland.

D O R Y O P T E R I S J. Sm.

D. CONCOLOR (Langsd. et Fisch.) Kuhn; *Pteris geraniifolia* Raddi.

Rocky Slopes of South Cedar Creek Gully, Ravenshoe; Dr. Joynt, Aug., 1913.

N O T H O L Æ N A R. Br.

N. DISTANS R.Br.; *Cheilanthes* Mett.

Ravenshoe; Aug., 1913.

Domin follows Mettenius in making *Notholaena* a subgenus of *Cheilanthes*. I have followed Christensen and others in keeping it as a separate genus.

C H E I L A N T H E S Sw.

C. TENUIFOLIA Sw.

Ravenshoe, on rocky slope of the Millstream; Aug., 1913.

Var. SIEBERI Hook. f.

Ibid.; Aug., 1913.

Domin (Prodr., p. 136 ff.) enters, in great detail, into the various forms of "*C. tenuifolia* (Sw.) s. ampl. et em." He makes Swartz's *C. tenuifolia* a subspecies of his amplified *tenuifolia*, and the following further subspecies: *Sieberi* Ktze; *multifida* Sw.; *queenslandica* subsp. n.; *nudiuscula* (R.Br.); *caudata* R.Br.; *Wrightii* Hook.; *bullosa* Ktze.; *Hancocki* Bak.; *Shirleyana* subsp. nov.; etc. Some of these "subspecies" are again subdivided into varieties and forms. I do not presume to criticise the detailed conclusions based upon a most painstaking examination of the material in herbaria, but I venture to question the practical usefulness of such minute subdivisions. My own specimens, at any rate, appear to fall readily into the typical divisions: *C. tenuifolia* Sw., and var. *Sieberi* Hook.f.

HYPOLEPIS Bernh.

H. TENUIFOLIA (Forst.) Bernh.

Stoney Creek, Cairns district; July, 1913.

ADIANTUM L.

A. ÆTHIOPICUM L.

Banks of Stoney Creek (very large fronds); July, 1913.

A. AFFINE Willd.; *A. Cunninghami* Hook.; *A. affine* var. *Cunninghami* C. Moore.

Cairns district; July-Aug., 1913; Waller, 1908.

Christensen (Index Fil.) keeps *A. Cunninghami* distinct from *A. affine*, limiting the latter to New Zealand; but specimens of *A. affine*, from New Zealand, kindly sent to me by Mr. Cheeseman, appear to be quite identical with the Australian fern. The glaucous colour of the frond (one or both surfaces) is fairly characteristic. Frequently, the upper side of the rhachis is densely covered with stiffish bent hairs; quite as often, it is ebony-smooth. My North Queensland specimens have, mostly, a smooth rhachis, but one frond is densely hirsute. Specimens collected by Mr. Waller, in 1908, all possess the hairy rhachis. This hirsute form, for the most part, has larger fronds than the glabrous, my own specimen being 30 cm. long and 45 cm. broad.

In a note, under *A. Cunninghami* (*A. affine* Willd., teste H.B., Syn., p. 117), Hooker (Sp. Fil. ii., No. 107) states that the pinules are "very glaucous beneath," the sori "always placed in a notch of a lobe of the margin (not in the sinus between the lobes)"; and, it is added, "the stipes is quite smooth, and the rhachis is everywhere perfectly glabrous." Similarly, H.B., in Syn., 117, "rhachis and surfaces quite naked, the latter very glaucous." Cheeseman (N.Z. Flora, p. 963) says, "quite glabrous, or the secondary rhachises pubescent above."

I have not access to Willdenow's description, but if it has governed, as no doubt it has, the descriptions of Hooker and Baker, the hirsute form should probably have recognition as var. *hirsutum* var. nov.

A. DIAPHANUM Bl.; *A. affine* Hook., Sp. Fil. ii., No. 65, non Willd.

Cairns district; July-Aug., 1913.

(?) Var. AFFINE A. van R.

Cairns district; July-Aug., 1913.

Hooker, *loc. cit.*, rightly called attention to the characteristic black bristle-like hairs (12 or more) which are produced between the veins on the upper surface, towards the lower margin and apex of the pinnules, with a few on the underside. A. van Rosenburgh's var. *affine* lacks these bristles, as does one frond among my North Queensland specimens.

A. HISPIDULUM Sw.

Cairns district; July-Aug., 1913.

Domin has dealt fully with the forms of this species, and has set up a new species, *A. tenue*, allied to *A. hispidulum*, but lacking the hairy surfaces.

P T E R I S L.

Subgen. *Eupteris*.

P. UMBROSA R.Br.

Bank of creek by "Crossing," Malanda; Aug., 1913.

A quite typical form, but the lower half of the pinnae almost, or quite, entire; typically serrate at apex.

P. BIAURITA L. var. QUADRIAURITA Luerss.; *Pt. quadriaurita* Retz.

Near Josephine Creek, Bartle Frere; July, 1913.

This fern and its allies have given considerable trouble to systematists. In H.B., Syn., *Pt. biaurita* is placed in the section *Campteria*, owing to the arched connecting veins at the bases of the pinnules, while *Pt. quadriaurita* is assigned to *Eupteris* (veins all free). The transitional forms, however, are so numerous as to throw doubt upon the tenableness of the sectional divisions. I, therefore, follow Luerssen and Domin in making the North Queensland fern (veins always free) a variety of *Pt. biaurita*. Bêche, in Herbarium, Sydney, appears to have regarded the two names as synonymous.

Subgenus *Litobrochia*.PT. TRIPARTITA Sw.; *Pt. marginalis* Bory.

Stoney Creek, near Cairns; July, 1913.

(?) Var. *FELICIENNÆ* (F.v.M.) Dom.

With some doubt I place here a young plant found near Major's Selection, Ravenshoe; Aug., 1913.

HISTIOPTERIS J.Sm.

H. INCISA (Thunb.) J.Sm.

Cairns district; July-Aug., 1913.

Pteridium aquilinum var. *esculentum* I did not find, nor the var. *lanuginosum*. Domin's var. nov., *yarrabense*, shows the leaf-formation of var. *esculentum*, with the "hairing" of v. *lanuginosum*.

MONOGRAMMA Schkhr.

M. PARADOXA (Fée) Bedd.; *M. Junghuhnii* (Mett.) Hook.

Var. *ANGUSTISSIMA* (Brack.) Dom.; *M. Junghuhnii* var. *tenella* Benth.

Among other ferns on branch of tree overhanging the creek above the Falls, near Major's, Ravenshoe; Aug., 1913.

Domin found this dainty rarity near Lake Eacham, and he states that this was but the second locality recorded, the first being "Rockingham Bay (Dallachy leg.)." My specimens were in excellent condition.

VITTARIA J.Sm.

V. ELONGATA Sw.

On dead tree lying in bed of Russell River; July, 1913.

Var. *Wooroonooran* Bail., I did not find.

ANTROPHYUM Kaulf.

A. RETICULATUM Kaulf.

Several localities, especially on rocks, etc., Frenchman's Creek; July, 1913.

The species of the genus *Antrophyum* are difficult to separate, and considerable confusion appears to exist in Herbaria. Mettenius has shown the importance of the cell-formation of the para-

physses that are often found in the sorus. In *A. reticulatum* and *A. callifolium* Bl., the end cells of the paraphyses are linear, while in *A. semicostatum* Bl., they are club-shaped. The separation of the two former species from one another is, failing access to well-authenticated specimens, not quite clear to me. Domin holds that the net-like sori of *A. reticulatum* are decisive; but my specimens vary considerably in that respect. I have no specimen that I can unhesitatingly refer to *A. callifolium*, which Domin succeeded in finding. Most of my specimens possess a distinct, central midrib, sometimes extending nearly half-way up the leaf, which attains as much as 19 inches in length. In the case of two or three plants, which grew on the face of a large boulder in the bed of Frenchman's Creek, the fronds had divided apices. Ferguson, in his "Ceylon Ferns" (p. 52), states that nearly all his specimens of *A. reticulatum* had costæ distinct for 4-5" up, and also that sometimes the fronds were "bifurcated." The Frenchman's Creek fronds, referred to above, were more than bifurcated. For convenient reference, I record these specimens as forma *apicilobatum*. (Plate lxxxviii., fig. 10).

POLYPODIEÆ.

HYMENOLEPIS Kaulf.

H. SPICATA (L.) Presl.

Babinda, Frenchman's Creek, Kuranda, etc.; July-August, 1913.

POLYPODIUM L.

Subgen. *Eupolypodium*.

P. GORDONI, sp. nov. (Plate lxxxix., fig. 12a-c).

Epiphyticum in arboribus et rupibus; *rhizoma* breve, paleis pallido-brunneis, dense confertis, breviter lanceolatis, plerumque obtusis, levibus præditum. *Stipites* conferti, brevissimi fere nulli, ad basin alati, nudi vel pubescentes. *Frons* erecta vel suberecta, 3-12 cm. vel ultra longa, 1-2 cm. lata, simpliciter pinnata, medio plus minusve oblonga, ad basin longiore, ad apicem brevior angustans, recta vel subfalcata; pinnis usque ad 20 vel ultra, maxime 1-1.5 cm. longis, 0.3-0.5 cm. latis, alternantibus, a basi lato confluyente vel subconfluyente oblongo-lanceolatis, obtusis, plus minusve recurvatis, inferioribus gradatim brevioribus, infimis in

basalem alam mergentibus; rhachi atra, angusta, levi vel sublevi, superficiebus levibus vel sublevibus; venis simplicibus, flexuosis, evanidis; venulis paucis, indistinctis, evanidis. *Sori* parvi, juventate elongati, obliqui vel subobliqui, immersi, depressione elationem in antica facie efficiente, usque ad 5 in serie, mediales, interdum a marginibus recurvis tecti. Sporangia numerosa; sporis magnis, rotundatis, viridibus. Textura subcoriacea.

On trees and the faces of boulders, Tully Falls; Watts and Gordon; August, 1913.

May be compared with *P. Walleri* Maiden & Betche, from which, however, it differs in its larger size, its more numerous elongate sori, etc. By its elongate sori, and its naked or nearly naked rhachis and surfaces, it appears to differ sufficiently from any of its allies. *P. fusco-pilosum* Bak. et F.v.M., with which this plant may be compared, differs in having a longer stipes, the rhachis and surfaces covered with dark red hairs, the scales setaceous, etc.; it also lacks the distinctly black rhachis of *P. Gordoni*, as seen from the under side.

P. MAIDENI, sp.nov. (Plate lxxxix., fig 11a-d).

Rhizoma robustum, repens, longe radiculosum, radiculis plus minusve rubro-hirsutis, paleaceum, paleis sub-brunneis lanceolatis, cum rigidis fusco-brunneis setis præditis. *Stipites* approximati, brevissimi, fere nulli, brunneo-setacei. *Frons* 15-25 cm. longa, 3-5 cm. lata, lineari-lanceolata, cito ad basin et subcaudatum apicem angustans, pinnata vel profunde pinnatifida; pinnis erecto-patentibus, multijugatis, alternantibus, linearibus, 1.5-2 cm. longis, 3-4 mm. latis, integris, sed apice subrenatis et sæpe angustatis, basi confluentibus et subcomplicatis, margine subrecurvis; rhachi et facie postica (interdum facie antica) setis brevibus, rigidis, fusco-brunneis præditis; venis simplicibus, solutis, non marginem attingentibus, plus minusve distinctis. *Sori* pauci (1-8) pinnarum apices versus vel in superiore dimidio, submarginales, profunde immersi in receptaculis crateriformibus, cum elatis setaceis marginibus, in pinnarum crenationibus, in facie antica projicientes. *Textura* subcoriacea.

Evelyn Scrub; R. F. Waller, December, 1908 (Hb. Syd., sub *P. fusco-pilosum* Bak. et F.v.M.).

Judging from the descriptions in A. van Rosenburgh (Malayan Ferns, p. 607), allied to *P. stenobasis* Bak., (from Sumatra), and *P. craterisorum* Harr., (from the Philippines); but sufficiently differing from both. The crater-like receptacles of the sori, with their more or less setaceous edges, are very marked. It differs greatly from *P. fusco-pilosum*, of which Mr. Bailey kindly sent me typical specimens.

Subgen. *Goniophlebium*.

P. VERRUCOSUM Wall.

Babinda and Frenchman's Creek; July, 1913.

P. SUBAURICULATUM Bl., with (?) var. *serratifolium* (Brack.) Hook.

Very frequent throughout the Cairns district, on trees or rocks. Good specimens from Ravenshoe, mostly epiphytic on trees.

Domin (Prodr., p. 172) holds that many of the Australian specimens determined as *P. subauriculatum* belong to the var. *serratifolium*. My own numerous specimens vary considerably in the nature of their serration, but are, all, more or less serrate. A van Rosenburgh (Malayan Ferns, pp. 662-3), says, of *P. subauriculatum*, "the edge entire, slightly crenate, or faintly toothed;" and, of the var. *serratifolium*, "Pinnæ coarsely toothed"; Hooker (Sp. Fil. v., p. 33) says, of this species, "serrated." H.B. (Syn. p. 344) describe the species as herbaceous or subcoriaceous, "the edge entire or slightly toothed," and the var. as "deeply toothed herbaceous form." Hooker, in Sp. Fil. (*loc. cit.*) cites Blume's figure of *P. subauriculatum* (Fl. Jav., ii., t. 83) as "very good"; and Blume's figure is distinctly serrated, though not, or scarcely, auriculate. Bailey's figure (Liths., 162), which Domin considers to be "certainly" var. *serratifolium*, shows stronger serrations than Blume's figure, but very distinctive auricles. Beddome, in Ferns of Brit. Ind. i., t. 78, figures *P. subauriculatum* with strong serrations, though the pinnæ are scarcely typical; his description is "serrated." The name "*serratifolium*" certainly seems to be misplaced, even if the variety itself should be recognised. Blume, in Fil. Jav. p. 177) makes no mention of an entire pinna, but simply says "serrulatæ," the accompanying figure, as stated above, is serrated somewhat strongly.

Subgen. *Pleopeltis*.

P. BROWNII Wikstr.; *P. attenuatum* R.Br., non Willd.

Cairns district; July-Aug., 1913.

On a felled tree, near Malanda, I found large quantities of a form of this fern, with the fronds throughout narrower and less coriaceous than those of the typical plant. It may be allowable to regard it as forma *gracile* (f. nov.).

P. SUPERFICIALE Bl., var. *australiense* Bail.

On tree in "Falling," Major's Homestead, Ravenshoe; Aug., 1913.

This Queensland variety differs from the type in having the sori limited to the upper half of the leaf, and the lamina reaching almost to the base of the stipes.

P. SIMPLICISSIMUM F.v.M.

On trees in "Falling," Ravenshoe, and at the Tully Falls; August, 1913.

Domin distinguishes var. *normalis* (fronds coriaceous, the sterile mostly lanceolate or linear-lanceolate, the fertile long-attenuate-linear, primary veins conspicuous, the rest obsolete) from the var. *wurunuran*, var.nov.(texture thinly herbaceous—not coriaceous—veins and venules strongly prominent, sterile fronds rhomboid-lanceolate, long acuminate, margin subentire). He holds Bailey's fig.(Liths., t.156) to be identical with var. *wurunuran*, which he found to be widespread on Bellenden Ker, while he had not observed the normal type. F. von Mueller published his species first (Frag., vii., 120) as *P. lanceola* Mett., but, on Kuhn's authority, distinguished it on p.156 (*op. cit.*). Domin recognised two forms of var. *normale*, viz., (a) margin subentire (obsoletely crenate); and (b) margin cartilagineous, conspicuously crenate. While Domin's var. *wurunuran* has wide sterile leaves like f."b" of var. *normale*, they are said to be long-acuminate, while in *normale* (f."b") they are "broadly oblong and obtuse." My specimens, according to this, belong to var. *wurunuran* Dom., and, in the absence of specimens of the specific type, must be so named.

P. MEMBRANIFOLIUM R.Br.; *P. nigrescens* Bl.

On tree. Frenchman's Creek; July, 1913.

Domin has satisfactorily shown (Prodr., pp.176-7) that Blume's *P. nigrescens* is identical with Brown's *P. membranifolium*, which was published 18 years earlier. The nervation clearly separates it from *P. pustulatum* Forst., and *P. scandens* Labill. Domin's var. *subsimplex* I did not find, though my specimens (all from one tree) include a simple frond and a trifid one. These, however, are larger than var. *subsimplex*.

P. PUNCTATUM (L.) Sw.; *P. irioides* Poir.

Stoney Creek, in large masses on the rocky banks, also on rock in bush, Rocky Hill, Kuranda; July-August, 1913.

This striking fern was named *Acrostichum punctatum* by Linnæus in 1763, and *P. irioides* by Poiret in 1804. Thunberg's *P. punctatum* (1784) is now removed to *Dryopteris* (subgen. *Phegopteris*). A return to Linnæus' name is but just; it should never have been changed. Bailey's two forms, *lobatum* and *cristatum*, are handsome additions to the bushhouse.

Subgen. *Grammitis*.*P. AUSTRALE* (R.Br.) Mett.; *Grammitis Billardieri* Willd.

On rocks and trees, Tully River, above Falls; August, 1913.

R. Brown and Willdenow published their names in the same year (1810) Christensen gives preference to *P. Billardieri*; Domin to *P. australe*.

P. HOOKERI Brack.

On rocks, very rare, Frenchman's Creek; July, 1913.

P. albosetosum Bail., I did not find.

Subgen. *Selliguea*.*P. AMPLUM* (F.v.M.) Dom.; *Grammitis ampla* F.v.M.; *Polypodium ellipticum* Christ; non Thunberg.

Cairns district; mostly round the coastal bases of Bartle Frere and Bellenden Ker; July-August, 1913.

Domin holds that this fern is endemic in Queensland, and is certainly distinct from *P. ellipticum* Thunb., to which it is often assigned. This conclusion is confirmed by specimens of *P. ellip-*

ticum in the Sydney Herbarium (from the Philippines), which have a long, unwinged stipes, a different cell-formation, and shorter rows of sori. Domin's var *stenorhaceum* (from Allumbah and Lake Eacham) does not seem to be represented in my collection.

P. SELLIGUEA Mett., var. SAYERI (F.v.M.) Dom.; *Grammitis membranacea* Bail.; *Polypodium Baileyi* C. Chr.

Herberton district (Ravenshoe, etc.); August, 1913.

In general appearance much like *P. amplum*, but the rows of sori are shorter, and the cell-formation is different. It is common in the scrubs on the Tableland, at Ravenshoe, but not in the coastal scrubs. Domin (Prodr., pp.184-7) gives a careful account of its different forms. His var. *normale* has simple fronds; and A. van Rosenburgh (Malayan Ferns, pp.671-3) defines *P. Selliguea* Mett., in that sense. The Queensland form, which has divided fronds, must, therefore, be regarded as a var. (*Sayeri*). I did not find the form with simple fronds.

CYCLOPHORUS Desv.

C. CONFLUENS (R.Br.) C. Chr.

Cairns district (? loc.); July-August, 1913.

C. ACROSTICHOIDES (Forst.) Presl.

Throughout the Cairns district, but found in large quantities on the northern side of the Barron River, at Kuranda; July-August, 1913.

Domin's notes on the genus *Cyclophorus* (Prodr., p.187) are very useful. He does not recognise *C. serpens* on the Australian continent, except in the var. *rupestris*; and he sets up a new species, *C. spicatus*. The structure of the scales on the rhizome is an important factor in the determination of the species of this interesting genus.

DRYNARIA J. Sm.

D. RIGIDULA (Sw.) Bedd.; *Polypodium* Sw.

At many places throughout the Cairns-Herberton district. The varieties *Vidgeni* and *cristata*, published by Mr. Bailey, are interesting bushhouse plants.

D. QUERCIFOLIA (L.) J. Sm.; *Polypodium* L.

Var. SPARSISORA (Desv.) Dom.; *Polypodium Linnæi* Bory.

On sandy coastal flats, Cairns; on boulder in Stoney Creek, etc.; July-August, 1913.

Var. *sparsisora* differs from the type in having smaller and irregularly scattered sori. My experience accords with Domin's; I did not find the typical *D. quercifolia* in North Queensland.

ELAPHOGLOSSUM Schott.

E. CONFORME (Sw.) Schott.

This species, I did not find.

ACROSTICHUM L.

A. AUREUM L.

This species, I did not find.

PLATYCERIUM Desv.

P. BIFURCATUM (Cav.) C. Chr.; *Pl. alcorne* Gaud.

Common in the North Queensland scrubs. Domin figures the vars. *normale*, *rhomboideum*, *lanciferum*, and *Hillii* (Moore).

P. GRANDE (A. Cunn.) J. Sm.

North Queensland scrubs.

As I did not bring back with me any specimens of the species of *Platycerium*, I am unable to make any notes on this genus.

GLEICHENIACEÆ.

GLEICHENIA Sm.

Subgen. *Eugleichenia*.

G. FLABELLATA R.Br.

Cairns district (?loc.); July-August, 1913.

G. LINEARIS (Burm.) Clarke; *G. dichotoma* (Thbg.) Hook.

In railway cutting, near Kuranda, and elsewhere; July-August, 1913.

The specimens vary considerably. Some of them have the rhachis and costæ more or less covered, underneath, with ferruginous hairs (! the var. *ferruginea* of A. van R., *Malayan Ferns*, p.59); others are nearly or quite naked, and have the segments emarginate at the apex.

A. van Rosenburgh (*loc. cit.*) describes the forma typica as, "Texture subcoriaceous; surfaces naked, not glaucous. Ultimate segments under 4 cm. long, entire or emarginate at the apex."

Subgen. *Platyzoma*.

G. MICROPHYLLA (R.Br.) Christ; *Platyzoma microphyllum* R.Br., Prodr., 160; *Gleichenia platyzoma* F.v.M.

This remarkable fern is said by Mr. Bailey (Fern World of Austr., p.25) to be found "in several parts of N. Australia and tropical Queensland," "on sandy hillocks." I did not find it, but specimens in the Sydney Herbarium (from Booroboloo, Northern Territory; leg. Baldwin Spencer, in 1902) exhibit a character that has been overlooked in many descriptions. I refer to the presence of very small leaves (apparently the sterile fronds) clustered together at the bases of the fertile fronds. These are not more than one-fifth as long as the fertile fronds. Though overlooked in later descriptions, these small fronds are referred to, as follows, in Robert Brown's original description (*loc. cit.*): "Frondes ex eodem rhizomate compresso-filiformes, indivisæ"

SCHIZÆACEÆ.

SCHIZÆA Sm.

S. DICHOTOMA (L.) Sm.; *Acrostichum* L.

In sandy coastal bush, about one mile north of Cairns Post Office (very fine specimens); August, 1913.

S. Forsteri, I did not find.

LYGODIUM Sw.

L. FLEXUOSUM Sw.; *L. japonicum* Benth., non Sw.; *L. semipinnatum* R.Br., fid. Domin.

Near Cairns; August, 1913.

I found very little of this fern. Domin holds (Prodr., 208 f.) that the occurrence of *L. japonicum* Sw., in Australia, is doubtful. He gives figures of *L. flexuosum* and *L. japonicum*, exhibiting the very deeply incised segments of the fertile fronds of the latter species. For the present, all the Queensland records of *L. japonicum* must apparently be transferred to *L. flexuosum*.

L. SCANDENS (L.) Sw.

Swamp at back of Cairns; August, 1913.

L. RETICULATUM Schkhr.

Throughout the Cairns district, especially in the scrubs near Kuranda; Watts and Philip Mackenzie; July-August, 1913.

A striking form was found at Kuranda, with abnormal leafy outgrowth, sometimes partially occupied by the sori, but more frequently quite sterile.

MARATTIACEÆ.

ANGIOPTERIS Hoffm.

A. EVECTA (Forst.) Hoffm.

On and near the banks of Josephine Creek, Bartle Frere; and elsewhere in the Cairns district. Very fine specimens, with fronds some 24 feet long, and 13 or 14 feet across, were seen near the Second Falls, Frenchman's Creek, Babinda; July-August, 1913.

This wide-spread species is so variable, that De Vriese has set up no less than 60 separate species. Domin appears to recognise a number of the species of Presl, De Vriese, and others as varieties of *A. evecta*. Specimens of *A. evecta* are in the Sydney Herbarium, with a note stating that they were collected on the Tweed River, in New South Wales, apparently the only reliable record for this State. No trace of *A. evecta* is to be found on Lord Howe Island.

MARATTIA Sw.

M. FRAXINEA Sm.

At many places in the Cairns district, in the creeks and gullies; common in the scrubs on the northern side of the Barron River, at Kuranda; July-August, 1913. Some confusion appears to exist regarding var. *salicina*. Domin takes it to be the common Australian and New Zealand form, with marginal sori. Mr. E. Betche (Herb. Syd.) regarded it as the form with long submedial sori, found on Lord Howe, Norfolk, and Pacific Islands. The species is very variable.

OPHIOGLOSSACEÆ.

OPHIOGLOSSUM L.

O. PENDULUM L.

Frenchman's Creek; July, 1913.

EXPLANATION OF PLATES LXXXVI.-LXXXIX.

Plate lxxxvi.

Fig. 1.—*Trichomanes Baileyanum*, n.sp.

a.—Rhizome and fronds; nat. size.

b.—Part of frond, showing lobe with fructification; magn.

c.—Part of frond, showing sterile lobes with nerves and spurious venules; magn.

d.—Rhizome and stipes; magn.

Fig. 2.—*Trichomanes Majoræ*, n.sp.

a.—Rhizome and fronds; nat. size.

b.—Part of frond, showing fructification; magn.

c.—Part of frond, showing sterile lobes, with nerves and spurious venules; magn.

d.—Rhizome and stipes; magn.

Fig. 3.—*Trichomanes Walleri*, n.sp.

a.—Rhizome and fronds; nat. size.

b.—Part of frond, showing fructification; magn.

c.—Part of frond, showing nerves and spurious venules; magn.

d.—Rhizome and stipes; magn.

Fig. 4.—

a.—Margin of frond of *Trichomanes nanum* V.d.B., var. *australiense* Bail.; magn.b.—Margin of frond of *Trichomanes Wildii* Bail.; magn.c.—Part of frond of *Tr. Wildii*, showing fructification; magn.

Plate lxxxvii.

Fig. 5.—*Hymenophyllum Babindæ*, n.sp.

a.—Plant; nat. size.

b.—Part of lobe of frond, showing dentations and sparsely haired rhachis; magn.

c.—Sorus with indusium; magn.

Fig. 6.—*Hymenophyllum Kerianum*, n.sp.

a.—Frond on rhizome; nat. size.

b.—Sori with indusia; magn.

c.—Lobe of frond, showing sinuato-denticulate margins; magn.

d.—Small piece of margin; magn.

e.—Cell-formation of lobe of frond; magn.

Fig. 7.—*Asplenium parvum*, n.sp.

a.—Frond; nat. size.

b.—Underside of pinna, showing sori and indusia.

c.—Upper side of pinna, showing striations.

Plate lxxxviii.

Fig. 8.—*Dryopteris albovillosa*, n.sp.

a.—Pinna, with portion of villose rhachis; nat. size.

b.—Lobe of pinnule; magn.

c.—Lobe of pinnule, underside; magn.

d.—Sorus, with indusium.

Fig. 9.—*Polystichum fragile*, n.sp.

a.—One of upper pinnæ; nat. size.

b.—Section of rhachis, showing canaliculation on upper side.

c.—An upper pinnule, upper side; magn.

d.—An upper pinnule, underside; magn.

e.—Sorus with indusium—*f*, sorus without indusium—*g*, indusium.

Plate lxxxix.

Fig. 10.—Tip of *Antrophyum reticulatum*, forma *apicilobatum*; half-size.

Fig. 11.—*Polypodium Maideni*, n.sp.

a.—Frond; nat. size, but portion of upper middle cut out.

b.—Rhizome and base of frond; nat. size.

c.—Scales at base of frond; magn.

d.—Crateriform sori with setaceous receptacles; magn.

Fig. 12.—*Polypodium Gordoni*, n.sp.

a.—Rhizome and fronds; nat. size.

b.—Scales at base of stipes; magn.

c.—Sori; magn.